UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
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September 27, 2021

VIA ELECTRONIC MAIL

Mr. Roger B. Petrie
Federal Facility Agreement Manager
Oak Ridge Office for Environmental Management
Department of Energy
Post Office Box 2001
Oak Ridge, Tennessee 37831

Dear Mr. Petrie:

The U.S. Environmental Protection Agency has reviewed the *East Tennessee Technology Park Main Plant Groundwater Focused Feasibility Study Oak Ridge, Tennessee* (DOE/OR/01-2894&D1) submitted by the Department of Energy Oak Ridge Reservation (DOE) on June 30, 2021.

This Focused Feasibility Study (FFS) addresses specific areas of groundwater contamination within the East Tennessee Technology Park (ETTP) Main Plant Area (MPA), including six chlorinated volatile organic compound (CVOC) source areas (K-1401, K-1024, K-1035, K-1407-B, K-27/K-1232, and K-1239), the technetium-99 radiological plume, and the K-1004 CVOC plume. Each of these eight areas are referred to as "Target Management Zones (TMZs)." Comments are attached which must be resolved before a revised document is submitted.

Following revision and approval of this FFS, the DOE has informed EPA that a Proposed Plan and an Interim Record of Decision will be prepared for the eight TMZs. It is EPA's expectation that the remaining 11 groundwater TMZs will be sequenced under subsequent FFSs and milestoned as interim actions consistent with the EPA letter of March 16, 2021 (Jones to Petrie). Eventually, all 19 of the interim ROD TMZs will be evaluated to determine if any remaining remedial action(s) will be necessary under a final groundwater ROD to facilitate the restoration of ETTP MPA groundwater to beneficial use consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (1980 as amended) and the National Contingency Plan.

If you have any questions or concerns regarding this matter or require additional information, then please contact me at (404) 562-8550, or electronically at froede.carl@epa.gov.

Sincerely,

Carl R. Froede Jr.
Senior Remedial Project Manager
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EPA Comments on the East Tennessee Technology Park Main Plant Groundwater Focused Feasibility Study Oak Ridge, Tennessee (DOE/OR/01-2894&D1)

General Comments

1. This document limits the treatment of contaminated groundwater (GW) to 50 feet below the ground surface. For the K-1401 site, the depth of CVOC dense nonaqueous phase liquid (DNAPL) contamination has been verified to approximately 112 feet below the ground surface. However, none of the remedial technologies reviewed in this FFS address contamination to that depth. While it is acknowledged that this IROD only targets GW contamination above 50 ft there will remain high levels of CVOC contamination at depth at this location and several others that are part of this IROD. This is a serious data gap that must be addressed through further site-specific GW characterization and additional technology review/application. Following the completion of the currently planned IROD actions, EPA provides notice that DOE will not be able to claim either Monitored Natural Attenuation or a Technical Impracticability waiver for any areas that contain contamination above MCLs – especially in those areas where poorly defined CVOC contamination extends below 50-ft. Further characterization and treatment will be necessary per EPA guidance and policy to meet the goal of restoring the ETTP Main Plant Area contaminated groundwater to MCLs and beneficial use.

2. Overall, there is significant uncertainty regarding the characterization of the target management zones proposed for interim remedial action in the FFS. It appears that DOE intends to manage these uncertainties through completion of several pre-remedial design investigations. Based on the results of the additional characterization, EPA may need to assess if any remaining uncertainties and data gaps in site characterization should be addressed prior to interim remedy selection.

3. The D1 version of the FFS reviewed by EPA is not approvable or consistent with the NCP or EPA guidance. Specifically, the FFS includes monitored natural attenuation (MNA) as an alternative (with LUCs) for two groundwater plumes, but the FFS does not provide support for the "lines of evidence" as described in EPA's guidance on MNA remedies nor does it adhere to the guidance's direction to include a contingency remedy[1] in the event an MNA remedy is unsuccessful.[2] While it is acknowledged that the FFS is not a decision document and any contingency remedy would be proposed in the Proposed Plan, this FFS should outline the data collection necessary to comply with EPA MNA guidance so that MNA can be presented as a viable alternative or if unsuccessful then demonstrate the need for a contingency remedy. In addition, it is unclear that DOE has sufficient support for not including ex situ treatment as an alternative, and it should be included.

4. The FFS does not consistently provide information for the contaminants to be addressed under this FFS. Section 1.1 (Purpose of the Report), states that the FFS focuses on chlorinated volatile organic compounds (CVOCs) and technetium-99 (Tc-99) in groundwater, but data for other non-CVOCs are provided. For example, Table 2.1 (ETTP Main Plant Area Groundwater COC [contaminant of concern] screening results summary) lists all constituents exceeding Maximum Contaminant Limits (MCLs) and Regional Screening Levels (RSLs) for the last ten years. In addition, Section 2.3.1 (K-1401) identifies 11 volatile organic compounds (VOCs) as primary COCs, but Appendix B (Target Management Zones [TMZs]), and Section 5.1 (TMZs) evaluate only 8 CVOCs to define plumes at each area. Furthermore,

[1] If a contingency remedy were included, it would also need to be consistent with EPA guidance on contingency remedies.
[2] *Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites*, OSWER Directive 9200.4-17P, April 1999.

Section 3.7 identifies six CVOCs that are of principal concern to human health at the site, including carbon tetrachloride; results for carbon tetrachloride are included in Table 2.10 (Summary of VOCs that exceed MCLs in the K-27/K-1232 Area). However, carbon tetrachloride is not included as one of the eight CVOCs evaluated in Appendix B and Section 5.1, and the text does not include a statement or reference for why certain VOCs were screened out. Finally, results for additional contaminants are provided in data tables in Section 2.0 (Nature and Extent of Contamination) [e.g., alpha activity results included in Table 2.14 (Concentrations of selected analytes exceeding MCLs in the K-1004 Area), but alpha activity is not addressed under this FFS]. The FFS should clearly identify the contaminants to be addressed under this FFS (i.e., list the specific CVOCs and additional contaminants such as Tc-99) and create a specific table of the other contaminants of issue that are not associated with the COCs (i.e., that are not daughter products of other COCs). Revise the FFS to specify the CVOCs that are included in the FFS and ensure information is consistently provided for each CVOC at each TMZ.

5. The figures in Section 2.0 (Nature and Extent of Contamination) and Appendix B (Target Management Zones) show contaminant plumes in the unconsolidated zone and bedrock, but include all monitoring wells and piezometers from both zones at each area. To better show the known extent of the plumes at each area, only those monitoring wells and piezometers from the target zone (i.e., installed in the unconsolidated zone or bedrock) should be included on each figure. In addition, wells that have not been analyzed for the COCs should not be included on the figures. Revise the figures for the unconsolidated zone and bedrock in Section 2.0 and Appendix B to include only those wells installed in each zone and from which samples were analyzed for the specified contaminant. Also, consider using solid lines for the plume extents that are known and dashed lines when the extent is uncertain.

6. The FFS does not consistently present sufficient data to determine if the extent of the source areas and plumes are delineated at each TMZ. Section 1.2.5 (Main Plant Interim Groundwater Remediation Scope and Strategy) states, "Six CVOC source areas are easily accessible for remediation activities and with current, and future, pre-design investigation (PDI), data will provide adequate information to finalize the limits of remediation in the unconsolidated and bedrock zones." However, based on the information presented in Section 2.0 (Nature and Extent of Contamination), most TMZs do not have sufficient data to define the extent of the source areas and plumes, and the data gaps and the potential future sampling activities are not discussed. Although it is acknowledged that uncertainties regarding site hydrogeology and the extent of contamination are anticipated, best estimates for the extent of contamination should be presented so that the remedial alternatives in the FFS can be evaluated appropriately. The following are examples at each TMZ where sufficient information is not presented.

a. Section 2.3.1, K-1401: Section 2.3.1 states that the source area of contaminated soil below the water table has been delineated; however, it is unclear how the source area was delineated. Based on Figure 2.5 (TCE [Trichloroethene]) concentrations in groundwater in bedrock in the K-1401 Area, no wells are present to the west and north of treatability study well BR-02, as well as east of treatability study well BR-05, both of which are assumed to be screened in the bedrock and are located in the source area with concentrations exceeding 1,000 micrograms/liter (ug/L) VOCs. In addition, based on Figure 2.4, TCE concentrations in groundwater in the unconsolidated zone in the K-1401 Area, the extent of the plume in the unconsolidated zone to the west, southwest, and east is not defined because no unconsolidated monitoring wells are present in these directions.

b. Section 2.3.2, K-1035: The text indicates that the plume in the unconsolidated zone and bedrock is delineated in areal extent as shown on Figure 2.7 (VOCs in groundwater in the unconsolidated zone in the K-1035 Area) and Figure 2.8 (VOCs in groundwater in the bedrock in the K-1035 Area), but the southernmost groundwater sample collected at DP19 had a TCE concentration of 1,000 ug/L in 2019. Therefore, it is unclear if the southern extent of TCE in the source area and the plume was determined, especially considering that the text notes that the groundwater flow in this area may not be fully understood. Also, the lateral extent of the plume in the bedrock is not delineated, because there is only one bedrock well (i.e., BRW-135) located beneath the unconsolidated zone plume.

c. Section 2.3.3, K-25/K-1024: The extent of the VOC source area and plume in the unconsolidated zone is not delineated. As shown on Figure 2.9 (VOCs in the unconsolidated zone at K-1024), several piezometers (e.g., Z2-EU21B-211P, Z2-EU21B-211N, etc.) have concentrations of VOCs above 1,000 ug/L, but there are no wells to the north, west, and south to delineate the extent of the source area. It is also uncertain how far the plume extends, as UNW-159 was not sampled and the nearest well to the north is over 600 feet away. In addition, it does not appear that the elevated VOCs at UNW-137 are delineated. Further, all of the samples collected from the four new bedrock wells exceeded the MCL for TCE, so the extent of the plume in bedrock is not defined.

d. Section 2.3.4, H-1407-B Pond: Based on Figure 2.12 (Distribution of VOCs in the bedrock in the K-1407-B Area), it is unclear if the source area and plume in the bedrock has been delineated downgradient of bedrock well BRW-108, since a bedrock well is not present near unconsolidated monitoring well UNW-068 and the depths of samples from the piezometers have not been specified. It also should be noted that a bedrock well is not present upgradient of BRW-134.

e. Section 2.3.5, K-1239 Contaminated Materials Disposal Pit: The extent of the source area located at the disposal pit and characterized by bedrock well BRW-129 is not delineated as the nearest bedrock well is more than 200 feet away [see Figure 2.14 (VOCs in bedrock at the K-1239 Contaminated Disposal Pit)]. The text in Section 2.3.5 notes that fractured bedrock is likely convoluted and controls groundwater flow, so it appears the plume should be characterized further considering the potentially uncertain groundwater flow pattern.

f. Section 2.3.6, K-27/K-1232 Area: Based on Figure 2.15 (VOCs in groundwater in the unconsolidated zone in the K-27/K-1232 Area) and Figure 2.16 (VOCs in groundwater in the bedrock zone in the K-27/K-1232 Area), there are no upgradient wells to the east of the source area (i.e., UNW-088 and BRW-122) to delineate the plume in the unconsolidated zone and the source area, and the plume in the bedrock.

g. Section 2.4.1, Tc-99 Plume: It is unclear how it was determined that the Tc-99 contamination does not extend south or west of piezometer Z2-EU22-502 in the unconsolidated zone. In addition, it is unclear how the areal extent of the downgradient plume at UNW-139 was determined, since there are unconsolidated monitoring wells without data (i.e., UNW-151, UNW-142) along the edges. Further, based on Figure 2.18 (Tc-99 in bedrock), the bedrock Tc-99 contamination is not delineated to the north (downgradient) and the closest monitoring well to the south is 600 feet away.

Revise the FFS to discuss the delineation and spatial boundaries of the source areas and plumes at each TMZ including any data gaps and how they will be addressed to ensure appropriate evaluation in the FFS and moving forward in the CERCLA process.

7. The basis for the contaminant concentration limits used to define the CVOC source areas and develop the interim remedial goals (IRGs) is unclear. Section 1.2.5 (Main Plant Interim Groundwater Remediation Scope and Strategy) states, "These CVOC source areas were defined on the basis of groundwater concentrations of 1,000 micrograms per liter (µg/L) for at least one of the CVOCs identified for that particular source, typically TCE. For source areas with high concentrations of vinyl chloride (VC), a concentration limit of 400 µg/L is used along with a 1,000 µg/L limit for other CVOCs." In addition, Section 4.2.1 (Source Area Interim Remedial Objectives and Goals) states that the IRGs for the CVOC source areas are individual CVOC concentrations of less than or equal to 1,000 µg/L. However, no rationale is presented which explains why these concentrations are appropriate to define source areas and serve as benchmarks. Further, it is noted that the hotspots of the K-1070 C/D G Pit and K-1070 C/D South plumes are shaded orange on Figure 1.2 (Main Plant FFS Target Management Zones) indicating CVOC concentrations in excess of 1,000 µg/L, but these plumes are not proposed for interim remedial action in the FFS, and it is unclear why this is the case. Revise the FFS to explain how the contaminant concentration limits are used to define the CVOC source areas and how IRGs were selected and developed and why they are appropriate and applicable. In addition, explain why the K-1070 C/D G Pit and K-1070 C/D South plumes are not included in the FFS.

8. The site-specific figures in Section 2.0 (Nature and Extent of Contamination) should indicate if they are depicting the source areas or cumulative VOC concentrations. Section 1.2.5 (Main Plant Interim Groundwater Remediation Scope and Strategy) and Appendix B (Target Management Zones), identify the source areas for each TMZ based on plume concentrations where at least one CVOC is above 1,000 micrograms/liter (ug/L; or 400 ug/L for VC), but the legends for the figures in Section 2.3, Source Area CSMs, differentiate the plumes based on VOC concentrations. Therefore, it is unclear if the orange areas in the figures depict where the cumulative concentrations of all VOCs are more than 1,000 ug/L (i.e., individual CVOCs may be less than 1,000 ug/L) or the source areas where one of the CVOCs remains above 1,000 ug/L. Revise the site-specific figures in Section 2 to clarify if they show the source areas where at least one CVOC is above 1,000 ug/L or cumulative concentrations of VOCs.

9. The site-specific data tables and figures in Section 2.0 (Nature and Extent of Contamination) do not consistently include all of the information for the wells used the delineate the source areas and plumes at each site. The following are examples for each TMZ where additional information is necessary.

a. Section 2.3.1, K-1401: Section 2.3.1 does not include a data table, and the CVOC plumes in Figure 2.4 (TCE concentrations in groundwater in the unconsolidated zone in the K-1401 Area) and Figure 2.5 (TCE concentrations in groundwater in bedrock in the K-1401 Area), appear to be primarily based on the results from the 2018 treatability study wells. However, the extent of the plume cannot be verified because the data are not included (e.g., total VOC concentrations for the wells included on the figures). Also, the figures do not differentiate between the treatability study wells in the unconsolidated zone and those in the bedrock, and depth information is not provided for any of the wells.

b. Section 2.3.2, K-1035: Table 2.4 (Concentrations of VOC analytes that exceed MCLs in the K-1035 Area) includes some CVOC data, but it is unclear why data for all wells shown on Figure 2.7 (VOCs in groundwater in the unconsolidated zone in the K-1035 Area) are not provided. In the unconsolidated zone, monitoring well K-1035-DPT-002 is the only well located outside the CVOC plume that has data reported in Table 2.4. Therefore, it is unclear if the other wells located downgradient (i.e., DP17, DP21, and UNW-163) and cross-gradient (i.e., DP-20) have been sampled to delineate the extent of the plume. In addition, Figure 2.7 does not include DP-14, which is listed in Table 2.3 (Monitoring well construction summary for the K-1035 Area) while piezometer K1035-DPT-001 is included on Figure 2.7 but is not listed in Table 2.3.

c. Section 2.3.3, K-25/K-1024: Table 2.6 (VOC concentrations in groundwater exceeding MCLs in the K-25/K-1024 Area, 2017 to 2019) includes some of the piezometers, but data are not included for all of them (e.g., the dashed lines for Z2-EU21B-035-1, Z2-EU21B-035-1A). In addition, other wells in the plume (e.g., Z2-EU22-503, UNW-137, BRW-136) where VOC concentrations in groundwater are shown to exceed MCLs on Figure 2.9 (VOCs in the unconsolidated zone at K-1024) and Figure 2.10 (VOCs in the bedrock at K-1024) are not included in Table 2.6. It is unclear why all of the data was not included to substantiate the extent of the plume as shown on Figure 2.9 (VOCs in the unconsolidated zone at K-1024).

d. Section 2.3.4, K-1407-B Pond: Table 2.7 (Monitoring wells in the K-1407-B Area) provides information for four wells screened in the bedrock, but there are many more bedrock wells shown on Figure 2.11 (Distribution of VOCs in the unconsolidated zone in the K-1407-B Area) and Figure 2.12 (Distribution of VOCs in bedrock in the K-1407-B Area). In addition, the VOC concentrations for the wells shown on Figures 2.10 and 2.11 are not provided.

e. Section 2.3.5, K-1239 Contaminated Materials Disposal Pit: Although the depth and concentration of TCE at bedrock well BRW-129 are provided in the text, it is unclear if the other bedrock wells surrounding this area and shown on Figure 2.14 (VOCs in bedrock at the K-1239 Contaminated Disposal Pit) have been sampled recently for CVOCs.

f. Section 2.3.6, K-27/K-1232 Area: Table 2.10 (Summary of VOCs that exceed MCLs in the K-27/K-1232 Area) includes data for bedrock well BRW-124 (with 71.7 ug/L TCE), but this well is not shown on Figure 2.16 (VOCs in groundwater in the bedrock zone in the K-27/K-1232 Area). In addition, Table 2.10 does not include data for UNW-086, UNW-030, UNW-036, Z2-EU15B-516, and Z2-EU15B-517, which are used to delineate the plume in the unconsolidated zone as shown on Figure 2.15 (VOCs in groundwater in the unconsolidated zone in the K-27/K-1232 Area).

g. Section 2.4.2, K-1004 Area: Table 2.14 (Concentrations of selected analytes exceeding MCLs in the K-1004 Area) provides VOC results for monitoring wells BRW-140, UNW-108, and UNW-161, but these wells are not shown on Figure 2.19 (Distribution of VOCs in the K-1004 Area). The TCE concentration at BRW-140 exceeded the MCL for TCE in 2019. In addition, data are not provided for bedrock wells BRW-050, BRW-051, and BRW-052 in Table 2.14, so it is unclear if these locations were characterized to provide data that separates the two plumes (i.e., BRW-111 to the north and BRW-054, BRW-073 to the south) or if the plumes could be connected.

Revise Section 2.0 to consistently provide the CVOC data and well locations used to delineate the source areas and plumes on the site-specific figures. At a minimum, the total CVOC data used to generate the plumes should be included with the figures (e.g., in a data table or on the figures as is done for Tc-99) for all TMZs.

10. According to Section 1.2.5 (Main Plant Interim Groundwater Remediation Scope and Strategy), "The DOE recognizes that despite several decades of study, some inherent uncertainty remains for

groundwater and subsurface conditions at ETTP [East Tennessee Technology Park];" however, it is unclear what these uncertainties include, as they are not summarized. Therefore, it is unclear how these uncertainties impact the development and selection of remedial alternatives. Revise Section 1.2.5 to summarize the uncertainties that remain with respect to characterization of the groundwater and subsurface conditions at ETTP, and evaluate how these uncertainties impact the development and selection of remedial alternatives. These revisions may best be addressed by adding an "uncertainty" subsection to Section 2.0 (Nature and Extent of Contamination), which summarizes existing uncertainties and data gaps.

11. The purpose of each PDI is unclear. Section 6.2.1 (Pre-Design Investigations) states, "The PDI would be designed to address and manage the uncertainties and challenges with the selected technology at the specific TMZ." However, specific uncertainties and data gaps at each CVOC source area and the K-1004 and Tc-99 plumes are not presented in conjunction with a general scope of work for each PDI. It is recognized that specific scopes of work will need to be developed for the PDIs outside of the FFS, but the FFS should identify known data gaps, and generally discuss how the PDIs will address these data gaps at each source area/plume. It is also acknowledged that Section 2.0 (Nature and Extent of Contamination) identifies some instances in which a PDI will be used to fill a data gap; however, this is not consistently applied throughout Section 2.0. For example, Section 2.3.2 (K-1035) states that the vertical extent of contamination at K-1035 is uncertain, but does not state that the PDI will be used to address this data gap. Revise the FFS to provide a clear and concise list of all data gaps at each CVOC source area and the K-1004 and Tc-99 plumes, and summarize how each PDI will be used to address these data gaps. If some data gaps will not be addressed by the PDIs, specify which data gaps will not be addressed (or do not need to be addressed) to successfully implement an interim remedy at this time.

12. According to Section 6.2.1 (Pre-Design Investigations), the "PDI data would be collected as part of future RDWP [remedial design work plan] implementation. The PDI would be designed to address and manage the uncertainties and challenges with the selected technology at the specific TMZ;" however, it is recommended that consideration be given to conducting these investigations prior to remedy selection such that the data can be used to refine that cost estimates to within the -30%/+50% margin allowed by the National Contingency Plan. Clarify why the referenced investigations are proposed to be conducted after remedy selection, or if it would be beneficial to conduct the investigations prior to remedy selection, and revise the text to recommend this.

13. The FFS does not discuss the known vertical extent of contamination for most TMZs, and it is unclear if collection of additional data prior to remedy selection is warranted to address this issue. According to Section 6.2.1 (Pre-Design Investigations), "In areas where CVOC concentrations are suspected to be present at concentrations greater than the source treatment thresholds, the PDI will further evaluate the depth of contamination. This may result in remediation of some TMZs to depths greater than 50 ft [feet]." Uncertainty in the vertical extent of contamination could have the potential to result in significant differences in remedy implementation costs from those assumed in the FFS. For example, Section 2.3.1 (K-1401) indicates that dense non-aqueous phase liquid in the bedrock extends to depths greater than 100 feet below ground surface, but it unclear if the vertical extent of contamination has been defined, or if treatment to these depths is warranted. The FFS should be revised to clarify at which sites the vertical extent of contamination is uncertain. In addition, the FFS should propose the collection of additional data prior to remedy selection to address this issue such that remedial alternatives can be appropriately scoped and costed.

14. Section 2.3.6 (K-27/K-1232 Area) states, "The source of the VOCs groundwater [sic] may lie

northeast of the building in the vicinity of the K-1131 and K-413 buildings, where operations used significant quantities of TCE. Ongoing Zone 2 investigations of soil and groundwater, north of K-27, suggest the possibility that multiple TCE soil source areas exist in the vicinity of these buildings. The data collected from the Zone 2 soils investigation currently underway in this area, and the data to be collected during the PDI phase for K-27/K-1232 will be evaluated to improve the CSM [conceptual site model] for this area." Based on this information, it is unclear if remedial alternatives for K-27/K-1232 can be appropriately scoped and costed within the -30%/+50% margin allowed by the National Contingency Plan. Revise the FFS to evaluate if sufficient data are available at this time to scope and cost remedial alternatives for the K-27/K-1232 Area.

15. Several issues were identified in review of the IRGs and performance metrics:

a. Section 4.1.1 (Chemical-Specific ARARs) states that "the information presented in Table 4.1 [i.e., the MCLs] may be used [emphasis added] to evaluate the interim remedial actions;" however, it is unclear if the MCLs will be used definitively to evaluate the interim remedial actions, and if so, how they will be used. Revise Section 4.1.1 to clarify if the MCLs will be used definitively to evaluate the interim remedial actions, and if so, how they will be used.

b. Section 4.2.1 (Source Area Interim Remedial Objectives and Goals) states, "The stated IRGs of the MPA [Main Plant Area] FFS source area sites are to reduce concentrations of individual chlorinated organics to less than or equal to 1,000 μg/L;" however, Section 1.2.5 (Main Plant Interim Groundwater Remediation Scope and Strategy) states that because the MCL for VC is lower than the MCLs for most other CVOCs, a VC source area is identified based on a concentration limit of 400 μg/L. Based on this information, it is unclear if an IRG of 1,000 μg/L for VC is appropriate, or if a more conservative IRG should be employed. Revise Section 4.2.1 to propose an IRG of 400 μg/L for VC or explain why 1,000 μg/L is an appropriate IRG for VC.

c. Section 4.2.2 (K-1004 and Tc-99 Interim Remedial Objectives and Goals) states that performance metrics for the K-1004 and Tc-99 plumes will be defined in the interim Record of Decision (IROD). However, if preliminary performance metrics are not defined in the FFS, it is unclear that the alternatives for the two plumes can be appropriately scoped (e.g., that monitoring will be necessary only for five years) and costed. Revise Section 4.2.2 to provide preliminary performance metrics for the K-1004 and Tc-99 plumes to demonstrate that the alternatives for the two plumes have been appropriately scoped and costed.

d. According to Section 6.2.2 (Performance Monitoring), "Performance metrics for determining when the IRA [interim remedial action] will be complete will be established in the RDWP [remedial design work plan]." However, Section 4.2.1 (Source Area Interim Remedial Objectives and Goals) states that "The stated IRGs of the MPA FFS source area sites are to reduce concentrations of individual chlorinated organics to less than or equal to 1,000 μg/L." Based on this information, it appears that the performance metric is the ability of the remedial action to reduce concentrations of individual chlorinated organics to less than or equal to 1,000 μg/L. In addition, Section 4.2.2 (K-1004 and Tc-99 Interim Remedial Objectives and Goals) states that the performance metrics for the two plumes will be defined in the IROD, not the RDWP. The revised FFS should address these apparent discrepancies.

16. No supporting rationale is provided for each of the design component parameters and assumptions presented in Table 6.4 through Table 6.8 for each of the remedial alternatives. Therefore, it is unclear

how all of the component parameters or assumptions were developed. For example, Table 6.4 (Significant ISTT design components for Alternative S1) does not provide rationale for the proposed heating and extraction well spacing of 18 feet, explain how the cap area and specifications were determined, or explain how an assumed 10,000 pounds of waste residuals was estimated. While it is acknowledged that some parameters can only be estimated at this time, the basis for all assumptions should be documented. It is recommended that a column be added to each design component table which lists the basis or rationale for each design component parameter or assumption. This information is needed to demonstrate that each alternative was appropriately scoped and costed. Revise Tables 6.4 through 6.8 to provide the basis or rationale for each remedial alternative design component parameter or assumption.

17. The "no action" alternatives include implementation of land use controls (LUCs); however, LUCs are considered to be a remedial action and should not be included in the "no action" alternatives. Revise the "no action" alternatives to remove implementation of LUCs as a component of the alternative. In addition, ensure Tables 7.1, 7.2, and 7.3 are updated to indicate that the "no action" alternatives do not meet the threshold criteria (i.e., overall protection of human health and the environment).

18. Table 7.1 (Detailed evaluation of remedial alternatives – Source TMZs) and Table 7.2 (Detailed evaluation of remedial alternatives – K-1004 Plume TMZ) state, "If radiological contamination is discovered during the course of implementing this technology, significant schedule delays could occur." It is unclear why this potential issue is only first mentioned in Tables 7.1 and 7.2, and not addressed in Section 5.0 (Identification and Screening of Technologies) or Section 6.0 (Development and Analysis of Alternatives). Revise the FFS to evaluate the potential for radiological contamination to be present at the CVOC source areas and K-1004 plume, and clarify if and how this should be considered in the development of remedial alternatives.

19. The potentiometric surface map provided as Figure 2.3 (Average potentiometric surface for the Main Pant Area of ETTP) is presented at such a scale that makes evaluation of groundwater flow at the individual TMZs difficult. In addition, although arrows for groundwater flow direction are provided on the site-specific figures, they are not always consistent with groundwater flow directions indicated by the groundwater elevation lines on Figure 2.3. For example, groundwater at the K-1401 area is shown to flow northwest on Figure 2.3, but the arrows on Figures 2.4 and 2.5 indicate groundwater flows to the north-northeast. As another example, groundwater elevation contours at the K-25/K-1024 area and K-1035 area on Figure 2.3 show a complicated groundwater potentiometric surface with localized changes in flow direction, but arrows on the site-specific figures indicate groundwater flows west at Building K-25/K-1024 and north at K-1035. Revise the FFS to include potentiometric surface maps for both the unconsolidated and bedrock zones for each TMZ.

20. The FFS uses different monitoring well/piezometer identifications in the text, tables, and figures. For example, Figure 2.6 (North–south cross section through the K-1401 Acid Line corridor) identifies two wells as "DPT-K1401-3" and "DPT-K1401-4" but these appear to be identified as "K1401-DPT-03" and "K1401-DPT-04" on Figure 2.4 (TCE concentrations in groundwater in the unconsolidated zone in the K-1401 Area). Also, Section 2.3.3 (K-25/K-1024) identifies wells using two identification protocols (e.g., as BRW-125 and FS-BR-06), but it is unclear why two identifications are used. Revise the FFS to consistently identify the monitoring wells/piezometers and to clarify the purpose when multiple identifications are used.

21. A discussion of the Uncertainty Analysis from the 2007 human health risk assessment (HHRA) is

not provided in Section 3.2 (Summary of ETTP Sitewide HHRA). The Uncertainty Analysis is an important component of the risk assessment process because it provides context to the results presented in the risk characterization and is helpful to support risk management strategies. To promote clarity and understanding of the 2007 HHRA, the Uncertainty Analysis from the 2007 HHRA should be presented and analyzed for its adequacy as it relates to the overall assessment. Revise Section 3.2 to include a summary of the Uncertainty Analysis performed for the 2007 HHRA.

22. The method used to evaluate vapor intrusion risk and hazard in the 2007 HHRA is not defined. Section 3.2.3 (Risk Characterization) states that the incremental lifetime cancer risk (ILCR) and hazard index (HI) for a vapor intrusion scenario that assumed that VOCs from groundwater could migrate through soil and into a building were less than the U.S. Environmental Protection Agency (EPA) benchmarks for all groundwater sources. However, it is unclear how this was determined in the 2007 HHRA (e.g., using the Johnson and Ettinger Model). Revise Section 3.2.3 to include a description of the methodology used in the 2007 HHRA to evaluate vapor intrusion risk and hazard.

23. It is unclear how sediment pore water and water above sediments collected from Poplar Creek were determined to be non-toxic. This is not explicitly stated in the summary of the ETTP sitewide ecological risk assessment (ERA), which is stated to have been conducted as part of the 1997 Record of Decision for the Clinch River/Poplar Creek Operable Unit, Oak Ridge, Tennessee, as described in Section 3.3 (Summary of ETTP Sitewide ERA). Revise Section 3.3 to explain how it was determined that pore water and water above sediments collected from Poplar Creek were non-toxic.

24. Section 3.4 (Summary of the Off-Site Groundwater HHRA) states that a comparison of off-site groundwater data to human health risk-based screening levels (RBSLs) was performed as part of the Groundwater Assessment Remedial Site Evaluation, Oak Ridge, Tennessee (year not given), but the RBSLs are not defined. Revise Section 3.4 to provide a reference for the RBSLs used to evaluate data collected from off-site locations.

25. Frequency-of-detection is no longer an approved EPA technique for removing potential COCs from further consideration. It is generally perceived as dated and was in use prior to the widespread and readily available regulatory agency-promulgated health-based screening criteria [e.g., the Risk Screening Levels (RSLs)]. In developing a site-specific COC list, any contaminant detected at a concentration in excess of the most relevant health-based screening criterion should be retained as a site COC. This comment applies to the comparison of the Preliminary Remedial Goals (PRGs) used in the 2007 HHRA and the current RSLs presented in Section 3.5.1 (Changes in HHRA Guidance for Estimating Exposure to Contaminants and Toxicity Values to Calculate Risks) as well as in Section 3.7 (COC Screening). Revise the FFS to remove exclusion of potential COCs on the basis of frequency of detection.

26. It is uncertain whether any analytes had detection limits in excess of screening levels. As shown in Section 3.7 (COC Screening), a chemical was considered potentially site-related if the highest detected concentration exceeded the background levels established in the 2007 ETTP Sitewide Remedial Investigation/Feasibility Study. However, non-detect chemicals should be retained as chemicals of potential concern (COPCs) in all instances when a detection limit exceeds the screening criterion to highlight data gaps and for the purposes of the public record. Revise the FFS to explain whether any non-detect chemicals were retained as COPCs in instances where a detection limit exceeded the screening criterion (for every sample collected from a given contact medium). If so, include a qualitative discussion of the non-detect COPCs and their influence on the risk assessment (e.g., degree to which the

exceedance occurs, likelihood of the contaminant being present above a level capable of eliciting an adverse health effect).

27. There is no Uncertainty Analysis provided in the risk evaluation for the COC screening performed for the FFS. There are several instances in the FFS where procedures used in the screening constitute an uncertainty that should be analyzed for potential impacts to the resultant COC list, as follows:

> a. Section 3.7 (COC Screening) states that analytes were not carried forward for further discussion if they had no MCL or RSL. This uncertainty should be discussed to determine whether these constituents without appropriate criteria can contribute significantly to site risks;
>
> b. Constituents with elevated detection limits, if present, should be discussed in an Uncertainty Analysis; and,
>
> c. Section 3.7 (COC Screening) includes a discussion of analytes that might be present at isolated locations or in infrequent sampling events that could contribute to the risk. These are also potential uncertainties that should be evaluated.

Revise the FFS to include an Uncertainty Analysis, to contextualize the COC screening, and include the elements described above.

<u>Specific Comments</u>

1. EXECUTIVE SUMMARY, p. ES-1: The first sentence states:

> This focused feasibility study (FFS) was completed under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)…

Please add the following text following the parenthesis:

> (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986, …

Please add this text as appropriate throughout the document where remedial work conducted under CERCLA is specifically referenced.

2. EXECUTIVE SUMMARY, p. ES-1: The second paragraph of the Executive Summary should also identify the 11 remaining areas of groundwater contamination across the ETTP Main Plant Area and explain why they have been excluded from this first group of eight sites.

3. EXECUTIVE SUMMARY, p. ES-1: The fifth paragraph, last sentence states that, "removal of Zone 2 soil will result in a significant source reduction to contaminated groundwater plumes." This suggests that there are multiple groundwater source areas that will be removed in the future under the Zone 2 ROD. The revised FFS must include a table identifying each currently known area in Zone 2 where a groundwater source material will be removed and the estimated volume of materials that will need to be removed to complete the action under the Zone 2 ROD.

4. EXECUTIVE SUMMARY, Risk Summary and Contaminants of Concern, p. ES-2: The second paragraph contains the statement that, "The vapor intrusion pathway was also evaluated but did not

identify any risk issues." This conflicts with a recently-transmitted Covenant Deferral Request for Zone 2 EU-15, which states:

> The total estimated VI cancer risk for the commercial/industrial worker is 2E-04 from all of the wells in the monitoring network combined (Table 4.2). This risk exceeds the TR of 1E-04 primarily due to inhalation of TCE (Table 4.2). For the individual monitoring wells, total cancer risks for workers were equal to or exceeded the TR (ranging from to 2E-04 to 1E-03) from TCE in two of the seven wells evaluated (Table 4.2). These wells include one well screened in the unconsolidated aquifer (UNW-088) and one well screened in the bedrock aquifer (BRW-122).
>
> The combined VI noncancer HI for the commercial/industrial worker is 59 from all of the wells in the monitoring network combined (Table 4.2). This HI represents the sum of all of the COPCs, regardless of their target organs; however, noncancer risk is assumed to be additive only for chemicals with similar target organs. When noncancer risks were summed for COPCs with similar target organs, the only COPC with an HI greater than 1 for the entire monitoring network was TCE. For the individual monitoring wells, HIs exceeded 1 from TCE in 5 of the 7 wells (ranging from 2 to 376).

Please review all past Covenant Deferral Requests for Zone 2 associated with the eight proposed TMZs to determine if vapor intrusion issues occur and update the text in the appropriate sections of the FFS to reflect the current information. Also identify any of the eight TMZs where a Covenant Deferral is anticipated and where a vapor intrusion analysis will occur in the future so this information is carried forward moving to the final groundwater ROD for the Main Plant Area.

5. EXECUTIVE SUMMARY, ARARs and Interim Remedial Action Objectives, p. ES-2: The first paragraph, second sentence, states that ARARs include location- and action-specific ARARs. Please add "chemical-," before "location-" since MCLs are chemical specific ARARs for restoration of groundwater.

6. EXECUTIVE SUMMARY, ARARs and Interim Remedial Action Objectives, p. ES-3: The first partial paragraph, last sentence, states that the IRAOs are "not final by any means." This kind of statement should be explained. Please note that if the IRAOs change in the Proposed Plan from what is presented in the FFS, the FFS may need to be updated prior to publishing the Proposed Plan in order for the Administrative Record to support the action proposed in the Proposed Plan. Since "[a]t a minimum, the proposed plan shall: (i) Provide a brief summary description of the remedial alternatives evaluated in the detailed analysis established under paragraph (e)(9) of this section," (40 CFR 300.430(f)(2)), without an updated FFS, the Proposed Plan may not meet the intent of or be consistent with this requirement.

Further, if the IRAOs change after the Proposed Plan is published, then EPA and DOE will need to ensure that the community relations in remedy selection is consistent with the NCP at 40 CFR 300.430(f)(3).

Please remove the text that states that IRAOs are "not final by any means" or add clarifying text that if the IRAOs change after the FFS is approved, DOE will, prior to submitting a D1 Proposed Plan for EPA review, consult with EPA regarding preparation for EPA review and approval of an update to the FFS.

7. EXECUTIVE SUMMARY, ARARs and Interim Remedial Action Objectives, p. ES-3: The FFS notes that there are two types of actions being undertaken under its scope. The first is a source control action, and is, therefore, acceptable for not identifying groundwater ARARs. Please see the NCP language for source control actions to ensure that this action is consistent.[3] The second type is described as, "The K-1004 bedrock plume and Tc-99 groundwater plume have either low concentrations of contaminants (K-1004) or quickly declining contaminant concentrations (Tc-99). Therefore, these two plumes represent low-concentration plume conditions. The IRAO for these plumes is to assess how low concentrations can be reduced with the implemented interim action. There is no numerical IRG for these two plumes." For these actions, please see the text at 40 CFR 300.430(e)(4) regarding groundwater actions to ensure that the FFS is consistent with this NCP language.[4] In a groundwater action, MCLs are relevant and appropriate requirement, and the text stating that there is no numerical IRG should be deleted. Therefore, please include the MCLs under the Safe Drinking Water Act so that a valid comparison of alternatives may be undertaken, consistent with 40 CFR 300.430(e)(9)(iii). In addition, discussion of ARARs is to be undertaken in the comparison of alternatives under the "effectiveness" discussion,[5] as well as in the factor relating directly to ARARs.

8. EXECUTIVE SUMMARY, Technology Screening, p. ES-3: This section notes that because the alternatives were developed to "minimize conflicts with future redevelopment of the site, the focus was on in situ remediation measures." It is not clear whether this is consistent with the NCP. This does not appear to be a valid basis for eliminating alternatives with ex situ treatment prior to the comparison of alternatives. Rather, ex situ treatment should be developed as an alternative and compared in the FFS.

9. Section 1.2.4, p. 1-6: The fourth paragraph, last two sentences, state that Adaptive Management is not addressed in this FFS but will be addressed in the IROD. While the meaning of this statement is not clear, unless there is another FFS that will lead to the IROD, this appears to be inconsistent with the NCP. The IROD is supposed to be based on the Administrative Record (AR), and this FFS is the part of the AR that evaluates the alternatives, including the one that is ultimately selected. If Adaptive

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[33] 40 CFR 300.430(e)(3). ("For source control actions, the lead agency shall develop, as appropriate: (i) A range of alternatives in which treatment that reduces the toxicity, mobility, or volume of the hazardous substances, pollutants, or contaminants is a principal element. As appropriate, this range shall include an alternative that removes or destroys hazardous substances, pollutants, or contaminants to the maximum extent feasible, eliminating or minimizing, to the degree possible, the need for long-term management. The lead agency also shall develop, as appropriate, other alternatives which, at a minimum, treat the principal threats posed by the site but vary in the degree of treatment employed and the quantities and characteristics of the treatment residuals and untreated waste that must be managed; and (ii) One or more alternatives that involve little or no treatment, but provide protection of human health and the environment primarily by preventing or controlling exposure to hazardous substances, pollutants, or contaminants, through engineering controls, for example, containment, and, as necessary, institutional controls to protect human health and the environment and to assure continued effectiveness of the response action.")

[4] 40 CFR 300,430(e)(4). ("For ground-water response actions, the lead agency shall develop a limited number of remedial alternatives that attain site-specific remediation levels within different restoration time periods utilizing one or more different technologies.")

[5] 40 CFR 300.430(e)(7)(i).

Management is part of the remedy, it will need to be evaluated in this FFS (unless DOE plans on another FFS prior to publishing the Proposed Plan and ROD).

10. Section 1.2.5, p. 1-7: The discussion in this section seems to be inconsistent with the remedial process under the NCP. For instance, it suggests that the purpose of the FFS is to collect additional information so that DOE can evaluate the viability of monitored natural attenuation as a remedy. Collection of information to characterize nature and extent of contamination is the function of a remedial investigation, not the function of an FS or FFS. Please clarify in this section how additional data collection beyond the RI/FS will move the CERCLA IROD process forward to a final ETTP MPA ROD.

11. Section 1.2.5, p. 1-8: The last paragraph states that MNA is expected to be "an important component of a final groundwater decision at the MPA." Please remove this statement, as it is pre-decisional and premature to predict what the final remedy will include. Please remove any similar text that goes beyond the scope of this FFS.

12. Section 1.3.7 Groundwater Treatability Study, p. 1-10: The text states:

> Field activities were completed in December 2017.

EPA Comment: This is an incomplete statement. Please change this sentence to:

> Field activities associated with remedial technology design characterization were completed in December 2017. A remedial technology demonstration was not proposed by DOE or implemented at the K-1401 site.

13. Section 1.3.8 East Tennessee Technology Park Main Plant Groundwater Feasibility Study, p. 1-10: The text states:

> The comments from EPA and TDEC on the D1 MPA FS indicated there was not enough characterization data to select a final remedy for groundwater.

EPA Comment: Please change this sentence to:

> The comments from EPA and TDEC on the D1 MPA FS indicated there was insufficient groundwater characterization for most of the 19 known plumes across the Main Plant Area especially for areas where deep groundwater contamination is known or probable. Therefore, a final groundwater remedy could not be selected due to insufficient groundwater plume characterization data.

14. Section 1.4, Groundwater Source Actions Under the Zone 2 ROD, p. 1-11: This section states that Table 1.1 [Status of Zone 2 groundwater source evaluations (April 2021)], presents the current status of the Zone 2 groundwater source investigations for the eight TMZs that are being evaluated in the FFS; however, it is unclear how these source investigations relate to or inform the current development of remedial alternatives. Revise Section 1.4 to summarize how the Zone 2 groundwater source investigations for the eight TMZs relate to or inform the current development of remedial alternatives presented in the FFS.

15. Section 1.5 REPORT ORGANIZATION, p. 1-13: The text states:

> Chapter 4: ARARs and IRAOs — Identifies action-, location-, and contaminant-specific ARARs and delineates the IRAOs for TMZs addressed in this FFS. The RA selected is only a part of a total RA (interim remedy), *and the final remedy will attain the ARAR upon its completion.*

(Italics added)

EPA Comment: The text in italics needs to be rewritten as follows:

… ~~and the f~~. The selection of the final groundwater remedy (to occur in the future) will be implement to meet all required ARARs and address final CERCLA RAOs.

16. Section 2.2, Site Geology and Hydrogeology, pp. 2-1 to 2-2 and Figure 2.1, Geologic map of the ETTP Main Plant Area, p. 2-3: The text describes the K-25 fault as a major fault in the study area, but this fault is not labeled on Figure 2.1. Revise Figure 2.1 to identify the location of the K-25 fault.

17. Section 2.2 SITE GEOLOGY AND HYDROGEOLOGY, p. 2-2: Text in the paragraph beginning with "The MPA is bounded by Poplar Creek" refers to periodic upstream flow reversals. It is unclear what is meant by an upstream flow reversal. This is unclear. Please clarify the text to better define the phrase "periodic upstream flow reversal" and explain when and why this occurs.

18. Figure 2.3, Average potentiometric surface for the Main Plant Area of ETTP, p. 2-6: The groundwater elevation data used to generate this potentiometric surface map are not provided, and the monitoring wells are not included on the figure. Revise the FFS to provide the groundwater elevation data used to generate this figure and revise the figure to include the appropriate monitoring wells.

19. Section 2.3.1, K-1401, p. 2-7: The text states that the source area below the water table has been generally delineated and is associated with dense non-aqueous phase liquid (DNAPL) comprised of mostly TCE; however, it is unclear if there are two separate sources for TCE contamination in bedrock. The contaminant-specific plume maps in Attachment 1 to Appendix B (Target Management Zones) show a separate area of TCE concentrations greater than 1,000 ug/L at bedrock well BR-02, but this area of elevated TCE is not connected to the other area of high TCE concentrations to the southeast (e.g., at DZ-01). In addition, TCE is shown to be less than 5 ug/L in the unconsolidated zone at BR-02 on Figure 2.4. Revise Section 2.3.2 to discuss the location, depth, and extent of the delineated source area at K-1401, as well as the TCE found in bedrock at BR-02. Please clarify.

20. Section 2.3.1, K-1401; Figure 2.4, TCE concentrations in groundwater in the unconsolidated zone in the K-1401 Area; and Figure 2.5, TCE concentrations in groundwater in bedrock in the K-1401 Area, pp. 2-7 to 2-11: The text states that DNAPL is present at K-1401 in the bedrock at depths greater than 100 feet below ground surface, but the location of the DNAPL is not shown on the site-specific figures. In addition, it is unclear if the extent of the DNAPL is known. Revise Section 2.3.2 to discuss the location and extent of the DNAPL and ensure the DNAPL is identified on Figures 2.4 and 2.5. Has the DOE proposed remedial limit of 1,000 ug/L for CVOCs been delineated vertically at the K-1401 site? That data should be presented in a cross-section and added to this section.

21. Table 2.1, ETTP Main Plant Area Groundwater COC screening results summary, p. 2-8: The notes at the bottom of Table 2.1 indicate that COCs have been selected based on a target risk of 1E-05; however, COCs should be selected based on a target risk of 1E-06. Revise Table 2.1 to identify COCs based on a target risk of 1E-06.

22. Section 2.3.1, K-1401, p. 2-9: The text states, "The plume map also shows that upgradient source(s) to the southeast (e.g., K-1070- C/D Area) contribute to the groundwater contamination plume at K-1401;" however, the plume maps provided in Appendix B (Target Management Zones) do not show a connection between plumes near the K-1070-C/D features (purple) and the K-1401 plume. It is unclear

how these sources may be contributing to the plume at K-1401. Revise the text and figures to clarify how the K-1070- C/D Area sources are contributing to the K-1401 plume.

23. Section 2.3.2, K-1035, p. 2-9: Discussion of the groundwater contamination around the former K-1035 building indicates there is an unknown vertical extent of contamination around this area. That being the case, there needs to be a commitment for further characterization of bedrock groundwater contamination in this area before selection of a final groundwater remedial action and ideally before implementation of an interim remedial action, so that the effects of the interim remedial action can be optimized and not adversely impact a final remedy selection for this site.

24. Figure 2.4, TCE concentrations in groundwater in the unconsolidated zone in the K-1401 Area, and Figure 2.5, TCE concentrations in groundwater in bedrock in the K-1401 Area, pp. 2-10 to 2-11: The titles of these figures indicate they show the concentrations of just TCE in groundwater, but the legends indicate the plumes shown represent total VOCs. In addition, the plumes shown on these figures are inconsistent with the plume maps for TCE in Appendix B, Attachment 1 (Plumes Maps). Revise the titles of Figures 2.4 and 2.5 to indicate the plumes shown are for total VOCs.

25. Figure 2.6, North–south cross section through the K-1401 Acid Line corridor, p. 2-13: The location of this cross section is not shown on a plan view map, and most of the wells identified on the cross section are not on Figure 2.4 (TCE concentrations in groundwater in the unconsolidated zone in the K-1401 Area) or Figure 2.5 (TCE concentrations in groundwater in bedrock in the K-1401 Area). For example, unconsolidated monitoring well UNW-051 is located between DPT-K1401-1 and DPT-K1402-2, but these two wells are not on Figures 2.4 and 2.5. Revise the FFS to clarify the location of this cross section and the include the wells used in the cross section on a figure.

26. Section 2.3.3, K-25/K-1024, p. 2-21: The text discusses TCE contamination in soil as south of the former K-1024 facility and mentions remedial action such as excavation of the contaminated soil, but the location of the remediated area is not identified on the site-specific figures. As this area is noted to be the likely source of the groundwater plume, revise Section 2.3.3 to specify the location and size of the source area relative to the plume and show the soil remediation area on the site-specific figures.

27. Figure 2.9, VOCs in the unconsolidated zone at K-1024, p. 2-24: The legend does not define the meaning of the blue circle around the unconsolidated piezometer Z2-EU21B-210G. Revise Figure 2.9 to clarify the reason for the blue circle around Z2-EU21B-210G.

28. Section 2.3.4 K-1407-B Pond, p. 2-27: At the bottom of page 2-27, text states "Wells north of the Mitchell Branch channel do not show detections greater than MCLs." Figure 2.11 presents a different picture and suggests that even the 1,000 ug/L total VOCs contour line extends across the stream near UNW-68. Presumably at least some of this above-1,000 ug/L groundwater contamination would include one or more VOCs with MCL exceedances. Figure 2.12 suggests an even greater area of VOC contamination above 1,000 ug/L extending to the north of Mitchell Branch. The text and figures should be consistent.

29. Figure 2.11, Distribution of VOCs in the unconsolidated zone in the K-1407-B Area, and Figure 2.12, Distribution of VOCs in bedrock in the K-1407-B Area, pp. 2-29 and 2-31: The location of the former unlined surface impoundment does not appear to be specified on the figures, because the legend defines the rectangle labeled K-1407-B as a former building location. As a result, it is unclear if the impoundment was the size of this rectangle or in only part of this area. Revise the figures to denote

where the former surface impoundment was located.

30. Section 2.3.4, K-1407-B Pond, p. 2-33: The text states that an upgradient source of VOC-contaminated groundwater is present (i.e., at UNW-20, UNW-024, and UNW-025), but the source of the contamination is not discussed. Revise the text to discuss the source of the upgradient contamination.

31. Section 2.3.5 K-1239 Contaminated Materials Disposal Pit, p. 2-33: Regarding the groundwater contamination detected by BRW-129 near the K-1239 disposal pit, there will need to be much more extensive investigation of groundwater contamination associated with this source area before an interim action is implemented. Please add text clarifying how this area will be characterized and identify the FFA document in which this work will occur.

32. Table 2.10, Summary of VOCs that exceed MCLs in the K-27/K-1232 Area, and Figure 2.15, VOCs in groundwater in the unconsolidated zone in the K-27/K-1232 Area, pp. 2-41 to 2-42: According to Table 2.10, the TCE concentration in monitoring well UNW-087 collected September 9, 2019, is 11 ug/L, exceeding the MCL for TCE of 5 ug/L, but this well is not shown to be within the VOC plume on Figure 2.15. Revise Table 2.10 and Figure 2.15 to resolve this discrepancy.

33. Section 2.4.1, Tc-99 Plume, p. 2-44: The text states, "The East Wing Purge Cascade units were located at the southern extremity of the East Wing," but these units are not labeled on the site-specific figures. In addition, the Tc-99 contamination was stated to have spread through electrical duct banks and the storm drain network, but these features are not shown on the site-specific figures. Based on Figure 2.17 (Tc-99 in the unconsolidated zone), the highest Tc-99 concentrations are located north of the southernmost part of the East Wing of K-25, so it is unclear if this area was the former location of the purge cascade units or part of the storm drain network. Revise Section 2.4.1 to clarify the location of the purge cascade units, which were the source of the Tc-99 contamination, the electrical ducts, and storm drain network that spread the contamination, and include these locations on the site-specific figures.

34. Section 2.4.1, Tc-99 Plume, pp. 2-44 to 2-45: The text does not discuss the Tc-99 contamination in bedrock well BRW-015, located northeast of the Tc-99 contamination in the unconsolidated zone. Since the source of the Tc-99 is stated to be contamination mobilized through the storm drain network, it is unclear how this contamination migrated into the bedrock but not the unconsolidated zone. Revise the text to discuss the Tc-99 concentrations found in the bedrock at former Building K-25, including the possible source for this contamination.

35. Section 2.4.1, Tc-99 Plume, p. 2-45: The text states that UNW-137 is the only well sampled monthly that continues to have Tc-99 above the MCL, but based on Table 2.12, Tc-99 concentrations in selected Tc-99 Area wells, it appears that most of the wells that had Tc-99 exceeding the MCL have not been sampled for years (e.g., UNW-139, UNW-140, UNW-141, UNW-145, etc.). It is also not specified how many wells are routinely sampled. Therefore, this statement may be misleading because many of the wells in Table 2.12 have not been sampled recently. Revise the text to clarify this statement for the wells that exceed the MCL.

36. Section 2.4.2 K-1004 Area, p. 2-50: There needs to be a correction to the concentration referenced in the paragraph that begins "Characterization sampling of the sediment…" Is the "soil concentration of 1,400,000,000 µg/kg in a soil sample" accurate? Please check this value.

37. Section 2.4.2, K-1004 Area, p. 2-51 and Table 2.14, Concentrations of selected analytes exceeding

MCLs in the K-1004 Area, pp. 2-52 to 2-53: The last sentence states that decreasing concentrations of contaminants in the plume support natural attenuation, but as shown in Table 2.14, TCE concentrations are only decreasing at one well (BRW-053). The TCE concentration in BRW-054 is increasing, while TCE concentrations are stable and not decreasing in BRW-113. Further, there is insufficient data from BRW-111 and BRW-073 to do a trend analysis. Additional data are needed for wells BRW-111, BRW-073, and any other wells with TCE detections above the MCL to evaluate whether natural attenuation is occurring at this site. Revise the text to acknowledge that only one well shows decreasing concentrations and that continued monitoring of other wells with MCL exceedances is needed. This comment also applies to FFS Section 6.4.3.

38. Table 2.14, p. 2-52: BRW-111 has only one round of data and the sample from that date contained 135 ug/L of TCE. BRW-111 may not be in a part of the designated K-1004 TMZ and if not, that should be noted in Table 2-13 and Table 2-14.

39. Section 3.4, Summary of Off-Site Groundwater HHRA, p. 3-7: The "Carcinogenic Risk" paragraph states that the evaluation of off-site groundwater estimated a total risk at each of 16 off-site locations to be within the EPA acceptable risk range. Revise this paragraph to include the numerical range (i.e., 1E-06 to 1E-04), and provide the specific risk estimates, noting that these locations were comprised of accessible residential groundwater wells and springs in the area.

40. Section 3.4, Summary of Off-Site Groundwater HHRA, p. 3-7: The second bullet under "Noncarcinogenic Risk" (sic) notes that fluoride and lithium have different toxic endpoints. Revise Section 3.4 to state what these endpoints are, and note that the section heading, "Noncarcinogenic Risk" is incorrect; it should be "Noncarcinogenic Hazard." This also applies to the text within the second bullet.

41. Section 3.4, Summary of Off-Site Groundwater HHRA, p. 3-7: The last paragraph describes a spring located in the Rarity Ridge area, on the west side of the Clinch River. This section concludes that the spring is not used as a drinking water source and, therefore, the hazard index is conservative. It should be noted that although manganese is a naturally occurring metal, it is an important neurotoxicant in children, and a discussion of whether recreational users can incidentally ingest the spring water is appropriate to include. Revise the last paragraph to discuss whether incidental ingestion of the spring water, particularly by children, is a complete exposure pathway.

42. Table 3.3, Comparison of 2007 PRG and 2018 RSLs for priority COCs identified by the 2007 RI/FS, p. 3-11: The 2018 RSLs have been superseded by several updates (most current RSLs were released in May 2021) and should be reviewed to ensure that none of the values presented on the table have changed. Revisions to Section 3.0 (Risk Assessment and COC Identification) of the FFS should evaluate whether changes to the RSLs affect the selection of the COCs and the comparison of PRGs and RSLs.

43. Section 3.6.1, Changes in HHRA Guidance for Estimating Groundwater Concentrations, p. 3-19: HHRA guidance more recent than that used in 2007 is mentioned in the first paragraph, including a citation for Region 4 Human Health Risk Assessment Supplemental Guidance [EPA 2014]). It should be noted that this document was updated in March 2018, and the most recent version should be cited. Revise this referenced paragraph accordingly and update the reference for this document in Section 8.0 (References).

44. Section 3.7, COC Screening, p. 3-21: The second paragraph beneath the bulleted items states that

RSLs representing a risk level of 1E-05 and an HI of 1 were used for screening the data. Revise this paragraph to explain why these levels were used, and not the standard risk level of 1E-06.

45. Section 4.1.1, p. 4-2: This section states that restoration of the groundwater is not an objective of the groundwater alternatives. Please correct this misstatement because while the attainment of MCLs is not the current remedial goal under this IROD the restoration of the groundwater remains the goal. Safe Drinking Water Act MCLs should be identified as chemical-specific ARARs.

46. Section 4.2.2, K-1004 and Tc-99 Interim Remedial Objectives and Goals, p. 4-7: The interim remedial action objective (IRAO) for the K-1004 and Tc-99 plumes is to assess the rate of contaminant reduction and forecast when the implemented interim action at these two plumes could achieve action-specific ARARs [Applicable or Relevant and Appropriate Requirements];" however, it is unclear how the timeframe can be forecasted when ARARs can be achieved if preliminary remediation goals or benchmarks are not specified in the IRAO. Revise the IRAO to include preliminary remediation goals or benchmarks for the K-1004 and Tc-99 plumes.

47. Section 5. IDENTIFICATION AND SCREENING OF TECHNOLOGIES, p. 5-1: It would probably be appropriate for this Section of the FFS to note that technologies that are screened out of consideration for the interim remedial action might have more viability for a final remedial action and that as the interim action is implemented, further assessment of remedial options for a final remedial action will occur.

48. Section 5.1, TMZs, p. 5-1: It is unclear what impact potential changes to the concentration limits used to delineate the boundaries of CVOC source areas and K-1004 and Tc-99 plumes will have on the cost of each alternative. Section 5.1 states that the concentration limits used to delineate the boundaries of CVOC source areas and K-1004 and Tc-99 plumes "are subject to change for the implementation of the actual interim remedy for the Main Plant groundwater, as detailed in a future interim PP [Proposed Plan] and interim ROD. Such changes will not affect the selection of technologies or evaluation of alternatives as detailed in subsequent sections of this report." It is unclear how changes to the concentration limits used to delineate the boundaries of CVOC source areas and K-1004 and Tc-99 plumes, which could result in changes to the extent of the source areas/plumes requiring interim remedial action, would not potentially affect the evaluation of alternatives. Should the extent of the source areas/plumes requiring interim remedial action change, this may result in changes to costs outside the -30%/+50% margin included in the National Contingency Plan. Revise Section 5.1 to evaluate the degree to which potential changes to the concentration limits used to delineate the boundaries of CVOC source areas and K-1004 and Tc-99 plumes could impact the cost of each alternative. In addition, revise the text to discuss how it is anticipated that the concentration limits may potentially change (more or less conservative, and by what order of magnitude).

49. Section 5.1, TMZs, p. 5-1, and Table 5.1, Target management zones, p. 5-2: According to Section 5.1, the following CVOCs were mapped to determine the TMZs: 1,1-dichloroethane (DCA); 1,1-dichloroethene (DCE); 1,2-DCA; cis-1,2-DCE; 1,1,1-trichloroethane (TCA); tetrachloroethene (PCE); TCE; and VC. However, Table 5.1 states, "TMZs identified based on combined area of CVOC concentrations. CVOC include PCE, TCE, carbon tetrachloride, cis-1,2-DCE, 1,1-DCE, VC, 1,1-DCA, and 1,1,1-TCA." It is unclear why these lists of CVOCs used to determine the TMZs are not the same. Revise Section 5.1 to clarify the CVOCs used to define the TMZs.

50. Section 5.1, TMZs, p. 5-1: It is unclear if the extent of Tc-99 in bedrock has been defined. This

section states, "There is a small area of Tc-99 in the bedrock near well BRW-015 which had a concentration reported slightly above the MCL with a concentration 1,360 pCi/L (Fig. 2.18); however, this area is not included as part of this FFS given its limited extent and relatively low concentrations." Based on Figure 2.18 (Tc-99 in bedrock), it is unclear if the extent of Tc-99 contamination in the vicinity of BRW-015 has been defined, as no downgradient wells appear to be present. Therefore, it is unclear if the extent of Tc-99 contamination is, in fact, limited. Revise Section 5.1 to provide data to support the conclusion that the extent of Tc-99 in bedrock is limited, and that no remedial action is warranted.

51. Section 5.1 TMZs, p. 5-2: Table 5.1 would be clearer if the "TMZ" line in the upper right part of the table indicated the underlying information was the TMZ area in acres rather than having the note below the table indicating the values shown are the areas of the TMZ in acres. This comment also applies to Table B.1 in Appendix B.

52. Section 5.1 TMZs, pp. 5-1 and following: Figure 5.1, Figure 5.2, and Figure 5.3 have TMZ source areas posted on them that are inconsistent with Table 5.1 TMZ source information. There should be a better way to integrate the table with the figures so that the table fully indicates the applicable TMZs for both the unconsolidated zone and bedrock. Text at the top of page 5-6 indicates that the larger of the TMZ for the unconsolidated zone or bedrock would be used to define the boundary of the overall TMZ applicable to each source area. If this is the approach to be followed, it makes little sense to have three figures that define the TMZs applicable to the unconsolidated, bedrock and composite intervals when one figure that shows the assumed maximum extent of the TMZ applicable to each source area would suffice. Please address in the revised document.

53. Section 5.2, Identification of Technologies, p. 5-6, and Tables 5.2 through 5.5: Groundwater monitoring is not a LUC as indicated in Tables 5.2 through 5.5; it is a separate technology. Further, groundwater monitoring cannot be used to determine if LUCs are effective (i.e., a different type of monitoring, such as inspection, is required). Instead, groundwater monitoring is a technology that is needed to evaluate whether monitored natural attenuation (MNA) and various in-situ and ex-situ process options are effective. Revise the FFS to better explain the role that groundwater monitoring plays in any MNA determination, include a separate monitoring process option, and ensure all applicable discussions in the text are updated.

54. Section 5.4.1, CVOC Source Areas, p. 5-13, and Table 5.3, ETTP groundwater technology screening for source areas, pp. 5-23 and 5-24: Groundwater extraction (vertical wells) were not retained in support of enhanced in situ bioremediation (EISB); however, they should be retained since recirculation may be needed to distribute amendments. Further, for disposal, groundwater reinjection should be retained as this option would be needed for EISB that utilizes injection wells if recirculation is required. Revise Section 5.4.1 and Table 5.3 accordingly.

55. Table 5.3. ETTP groundwater technology screening for source areas, p. 5-15 and following: Because this is an interim action and the results from this action are expected to be useful in selecting final remedial options for groundwater remediation, is there some basis for retaining remedial options (Table 5.3) or selecting (perhaps at one of the source areas as a demonstration project) a remedial option so that its effectiveness on a relatively small scale can be field tested for its ability to be implemented as a full-scale (final) remedial action? This might be done on a limited basis such that a preferable remedial alternative is applied at the majority of TMZs targeted in the interim action.

56. Table 5.3. ETTP groundwater technology screening for source areas, p. 5-15 and following: Please clarify in the text why the disposal of treatment residuals implementability score would be equivalent for the on-site and off-site source areas options (Table 5.3) but have a different score for the onsite and off-site K-1004 options (Table 5.4).

57. Section 6.1, Development of Alternatives, pp. 6-1 through 6-2: It appears that long-term or performance monitoring should be listed as a main component of each alternative for the CVOC source areas and K-1004 and Tc-99 plumes. Without monitoring, it is unclear how the success of the interim remedies will be assessed. Revise Section 6.1, including Tables 6.2 (Technology components for individual K-1004 plume Alternatives) and 6.3 (Technology components for individual Tc-99 Plume Alternatives), to include long-term or performance monitoring as a main component of each alternative (and include monitoring in the title of each alternative).

58. Section 6.2.1, Pre-Design Investigations, p. 6-3: This section states, "For the purposes of simplifying the scope of design investigations across ETTP, it has been assumed that five unconsolidated zone monitoring wells and five bedrock zone wells will be installed at each TMZ to collect additional data to properly size and design the selected alternative at individual TMZs." However, the basis for the number of wells assumed is unclear. Clarify how an average of 10 additional wells per site was determined to be applicable. If any source areas/plumes are known to require significantly more wells than this, clarify this as well.

59. Section 6.2.2, Performance Monitoring, p. 6-4: Several issues were identified in review of this section:

a. This section indicates that it is assumed that a portion of the new wells installed in the TMZs as part of the PDIs will be located such that they can be used as the performance monitoring wells for each remedy. Based on this, it is unclear if installation of additional new wells to conduct performance monitoring is also assumed.
b. In addition, this section states that the target analytes for performance monitoring are assumed to be the same that are currently used for the Remediation Effectiveness Report (RER) wells; however, the text does not specify what the analytical suite for the RER wells includes, and why it is appropriate to monitor remedy performance.
c. It is unclear if the scope of monitoring at the K-1004 and Tc-99 plumes differs from that assumed for the CVOC source areas, given that MNA is a component of each remedial alternative for the plumes, but not for the CVOC source areas.

Revise Section 6.2.2 to address these issues, such that the scope of the performance monitoring is clear.

60. Section 6.2.2, Performance Monitoring, p. 6-4: Referring to Section 6.2.2, it is EPA's expectation that remedy performance monitoring of any EISB remedial action will include monitoring of key metals that may be solubilized due to enhanced anaerobic biological activity. This process has been identified at sites where enhanced bioremediation causes anerobic conditions. An example is the Peach Orchard Road PCE Superfund Site in Augusta, Georgia, where enhanced bioremediation through substrate injections caused arsenic groundwater concentrations to increase above the 10 ug/L MCL and iron concentrations increased to tens of mg/L (from levels less than 1 mg/L) at several wells in areas where a carbon source was injected. Add to this section that DOE will monitor for key metals during remedy performance monitoring to ensure that there is no public hazard created in the event of anaerobic biological activity.

61. Section 6.2.3, LUCs, p. 6-4: This section lacks sufficient detail to understand the LUC component of each remedial alternative. For example,

a. It is unclear where LUCs are specifically proposed or required as no figures are presented that depict existing or proposed LUC boundaries.
b. In addition, the text states that LUCs include engineering controls, but it is unclear what specific engineering controls are required or proposed, as none are described.
c. Further, the text states that LUCs "may include additional requirements for constructing buildings until groundwater future final cleanup goals are achieved;" however, it is unclear if such LUCs are, in fact, required or proposed, what they specifically include, where they apply, and when and how they would be implemented.
d. The text states that institutional controls prohibit use of groundwater, but it is unclear if other restrictions, such as no residential use, also apply.

Revise Section 6.2.3 to address each of the above-listed issues.

62. Section 6.2.5, Site Transfer Status, p. 6-5: According to this section, "The disposition of each of the TMZs will have to be carefully considered in all alternatives to ensure access to the sites is available for implementation of the selected alternative." It is unclear what is meant by this statement. Revise Section 6.2.5 to specifically identify at which TMZs the site status has the potential to impact implementation of the remedial alternative, and when and how resolution of any potential issues will be resolved.

63. Section 6.3, Detailed Description of Alternatives for Source TMZs, p. 6-7: This section states, "K-1239 Area is the only source area where unconsolidated treatment would not be performed, as there is very little unconsolidated soil at this site location due to historical site grading activities. K-27/K-1232 currently does not show source contamination in the unconsolidated zone; however, Zone 2 work has indicated there is a potential for there to be a source in this zone." It is unclear if the costs for the alternatives for each of these sites were adjusted to account for no unconsolidated zone remedial action, or if unconsolidated remedial action was assumed. In addition, Figure 5.2 (Bedrock zone TMZ Areas) indicates that no bedrock zone remedial action is required for K-1035; however, this is not noted in Section 6.3, and it is unclear if remedial alternative costs were adjusted accordingly. Revise Section 6.3 to explain if the remedial alternatives and associated costs for K-1239 and K-27/K-1232 assumed no unconsolidated zone remedial action, and no bedrock zone remedial action for K-1035.

64. Section 6.3, Detailed Description of Alternatives for Source TMZs, p. 6-7: This section states that the K-1401 area (with a 50-foot target depth) was used as a model source area site for the development of the conceptual designs and cost estimates for the source area alternatives. The text does not discuss why this source area was chosen as the model source area, or if there are any differences in the source areas (other than those for which no remediation is proposed for the unconsolidated zone) that may significantly impact implementation of the alternative and costs relative to that for K-1401. Revise Section 6.3 to explain why K-1401 was selected as a model source area, and evaluate if there are any differences in the source areas (other than those for which no remediation is proposed for the unconsolidated zone) that may significantly impact implementation of the alternative and costs relative to that for K-1401. As part of this revision, the text should compare ranges of concentrations of contaminants at each source area, along with whether DNAPL is potentially present at each area.

65. Section 6.3.2, Alternative S1 – ISTT and LUCs, p. 6-7: It is unclear how in-situ thermal treatment

(ISTT) will be effectively implemented in the bedrock zone, as this is not addressed in Section 6.3.2. The text also does not address if ISTT will effectively address DNAPL at sites where it may be present. According to Table 5.3 (ETTP groundwater technology screening for source areas), there will be significant challenges associated with collecting vapors from the bedrock zone and a high potential for volatilization with the potential to move contamination rather than capturing it. However, Section 6.3.2 does not discuss these issues and evaluate how the treatment system will be designed to address them. Revise Section 6.3.2 to discuss how ISTT will be effectively implemented in the bedrock zone, and how the issues outlined in Table 5.3 will be addressed. As part of this, ensure that the FFS also evaluates if ISTT will effectively address DNAPL.

66. Tables 6.4, Significant ISTT design components for Alternative S1, and Table 6.5, Significant EISB design components for Alternative S2, pp. 6-9 and 6-12: These tables indicate that the K-1401 source zone that requires treatment is 0.54 acres, but Figure 5.1 (Unconsolidated zone TMZ Areas) indicates that the source zone is only 0.47 acres [with another 0.25 acres of groundwater in bedrock that requires treatment, per Figure 5.2 (Bedrock zone TMZ Areas)]. Revise the FFS to address this apparent discrepancy.

67. Section 6.3.3, Alternative S2 – EISB and LUCs, p. 6-12, and Section 6.4.2, Alternative P1 – EISB and LUCs, p. 6-16: These sections state that "PDI testing (e.g., tracer testing or other strategies) may help to identify placement of injection wells to optimize substrate distribution and monitoring of the remedy." It is unclear if additional data is, in fact, warranted to help to identify placement of injection wells, and what "other strategies" may include. It is noted that, generally, a high-resolution study is conducted to optimize where to place EISB substrate, and 10 wells would not be sufficient for this purpose. Revise Section 6.3.3 to clarify if additional data are needed to identify placement of injection wells to optimize substrate distribution and monitoring of the remedies, what these data needs include, and how the data will be collected.

68. Table 6.5, Significant EISB design components for Alternative S2, p. 6-12: Several issues were identified in review of Table 6.5:

> a. The basis for the assumption that injections on 20-foot centers will be sufficient, particularly in bedrock, is unclear.
> b. Depending on the concentrations, two rounds of injections may not be sufficient. It is unclear why two rounds of injections are assumed.
> c. The need for rebound monitoring is not considered.

Revise Table 6.5 to address each of the above-listed issues to demonstrate the Alternative S2 (EISB and LUCs) was appropriately scoped and costed.

69. Section 6.3.3, Alternative S2 – EISB and LUCs, p. 6-12: According to this section, "the lessons learned from the 7000 Area treatability study for EISB will be carefully assessed during the remedial design;" however, it is unclear if any lessons or data were generated that potentially impact the scoping of the EISB alternative as part of the FFS. Revise this section to discuss whether results or conclusions from the 7000 Area treatability study for EISB impact the scoping of the EISB alternative as part of the FFS.

70. Section 6.3.4, Alternative S3 – ISSM, EISB, and LUCs, pp. 6-13 to 6-15: Several issues were identified in review of the description of Alternative S3 (ISSM [in-situ soil mixing], EISB, and LUCs):

a. It is unclear if this alternative will be implemented at all CVOC source areas. Section 6.3 (Detailed Description of Alternatives for Source TMZs) states, "K-1239 Area is the only source area where unconsolidated treatment would not be performed, as there is very little unconsolidated soil at this site location due to historical site grading activities. K-27/K-1232 currently does not show source contamination in the unconsolidated zone; however, Zone 2 work has indicated there is a potential for there to be a source in this zone." Based on this information, it is unclear if Alternative S3 applies to K-1239 and K-27/K-1232 given that ISSM cannot be implemented in the bedrock zone.
b. The text states, "Clean, unsaturated soil would first be removed to reduce the volume of soil to be mixed and to allow room for swell of the soil." It is unclear if and how it will be determined that such soil is "clean" (i.e., if it will be sampled and analyzed, and what the scope of sampling and analysis would include), and what volume of clean soil is expected at each site (and what data this is based on).
c. According to the text, "During ISSM activities, it is assumed that a temporary, HEPA [high-efficiency particulate air]-ventilated tent would need to be installed to prevent emissions of VOCs." However, it is unclear if and how these emissions would be captured and treated, or if air monitoring will be warranted to ensure the tent is working as designed.
d. The text states, "additional reagents, such as cement, might need to be mixed with the soil if higher-strength soil is required for future reuse of the site." It is unclear for which sites it is anticipated that higher-strength soil may be required.
e. The text states that mixing with cement should not be performed until approximately four months after mixing; however, this timeframe is too short, depending on the type of zero valent iron (ZVI), which will likely be effective for more than four months.
f. The text states, "The injections would be performed after the ISSM is complete and the soil has stabilized to support the drill rig." It is unclear how it will be determined that the soil has sufficiently stabilized.
g. The text states, "For the purposes of this evaluation, it was assumed that the first injections would occur at year 2, and a second round of injections would occur at year 4 and be followed by post-injection monitoring." However, the remedial action is stated to take five years in total, and it appears that one final year of post-injection monitoring will be insufficient to monitor groundwater concentrations following the year 4 injection. Additional rebound monitoring after year 4 therefore appears to be warranted. A contingency period of time should be contemplated and proposed to demonstrate that sufficient time has past to determine the success or failure of the treated area.

Revise Section 6.3.4 to address the above-listed issues to demonstrate that Alternative 3 was appropriately scoped and cost estimated.

71. Section 6.4.2, Alternative P1 – EISB and LUCs, p. 6-16: It is unclear if EISB will be effective in addressing contamination in the bedrock zone, as this is not addressed in Section 6.4.2. According to Table 5.4 [ETTP groundwater technology screening for K-1004 (Bedrock Plume)], this technology only scored a 2 out of 5 for effectiveness, and the table states there are delivery challenges; however, Section 6.4.2 does not discuss these issues or evaluate how the treatment system will be designed to address them. Revise Section 6.4.2 to discuss the challenges with effective use of EISB in the bedrock at K-1004 referenced in Table 5.4, and explain how these issues will be addressed through the design of the alternative.

72. Section 6.4.2, Alternative P1 – EISB and LUCs and Table 6.7, Significant EISB design components for Alternative P1, p. 6-18: Several issues were identified with the monitoring component of Alternative P1 (EISB and LUCs):

a. It is unclear if performance monitoring or monitoring natural attenuation (MNA) monitoring are proposed as a part of the alternative, or both. The purpose of each type of monitoring is different; therefore, Section 6.4.2 should specify if both performance monitoring and MNA monitoring are proposed.
b. It is unclear why Table 6.7 proposes the installation of five performance monitoring wells in the unconsolidated zone, given that remediation is only targeting the bedrock zone. Table 6.7 should be revised to propose bedrock performance monitoring wells only, or explain why the unconsolidated zone also warrants performance monitoring.
c. This section states, "Following active treatment and decommissioning, MNA would be implemented." However, no details of the MNA component of the alternative are provided. Therefore, it is unclear if this component was appropriately scoped and costed. Section 6.4.2 should be revised to provide the details of the MNA component of Alternative P1, including the number of wells proposed for MNA sampling, the proposed analytical suite, and the proposed frequency and duration of monitoring. It is noted that rebound monitoring and long-term monitoring are likely necessary for significantly longer than five years due to the potential for back-diffusion of contamination from finer-grained soils over a long period of time.

Revise Section 6.4.2 and Table 6.7 to address these issues.

73. Section 6.4.3, Alternative P2 – MNA and LUCs, p. 6-19: This section states, "There is no known source, or wells, with concentrations indicative of a source." However, Section 2.4.2 (K-1004 Area) states, "The Zone 2 soils characterization and process knowledge has identified some potential sources of groundwater contamination in the K-1004 Area; however, not all potential source areas have been fully defined." These statements appear to be at odds with one another. Revise Section 6.4.3 to address the discrepancy with Section 2.4.2. In addition, explain if and how the results of the Zone 2 investigations impact the applicability of use of MNA as a remedial alternative at K-1004. Finally, evaluate if additional investigation is warranted to define the potential source areas at K-1004 prior to implementation of an interim remedy.

74. Section 6.4.3, Alternative P2 – MNA and LUCs, p. 6-19: This section states, "For costing purposes, it was assumed that the MNA monitoring would be performed for five years. After this time period, the performance will be re-evaluated and continued, as needed." It is unclear if five years of MNA monitoring is an accurate assumption based on currently available data and contaminant trends, as this is not discussed. In addition, it is unclear if the costs include additional years of MNA monitoring, if more than five years is deemed warranted. Revise Section 6.4.3 to explain the basis for the assumption that five years of MNA monitoring would be appropriate, and if additional years of monitoring are included in the costs.

75. Section 6.4.3, Alternative P2 – MNA and LUCs, p. 6-19, and Section 6.5.3, Alternative Tc2 – MNA and LUCs, p. 2-23: These sections state that the target analytes for MNA monitoring are assumed to be the same that are currently used for the RER wells; however, the text does not specify what the analytical suite for the RER wells includes, and why it is appropriate to evaluate MNA. Revise Sections 6.4.3 and 6.5.3 to specify the proposed analytical suites for MNA monitoring.

76. Section 6.5.2, Alternative Tc1 – Chemical Reduction via SBGT, MNA, and LUCs, p. 6-20: The number of subgrade biogeochemical treatment (SBGTs) and extractions wells (and supporting rationale for the proposed number) warranted under Alternative Tc1 (Chemical Reduction via SBGT, MNA, and LUCs) is unclear. Section 6.5.2 states, "Three SBGTs would be constructed in the areas of highest known Tc-99 concentrations and extraction wells would be placed around them." It also states, "Based on the latest data, three different SBGTs were selected for this alternative." However, it is unclear how many extraction wells are proposed, as this is not stated. In addition, no data are described or referenced which support use of three SBGTs. Revise this section to provide rationale for the number of SBGTs and extraction wells proposed.

77. Section 6.5.2, Alternative Tc1 – Chemical Reduction via SBGT, MNA, and LUCs, p. 6-20: This section states, "This alternative also includes MNA monitoring of the more dilute plume over the 5-year period;" however, no details describing the MNA component of the alternative are provided. Therefore, it is unclear if this component was appropriately scoped and costed. In addition, it is unclear if the proposed five years of MNA monitoring is an accurate assumption based on currently available data and contaminant trends, as this is not discussed. Revise Section 6.5.2 to provide the details of the MNA component of Alternative Tc1 (Chemical Reduction via SBGT, MNA, and LUCs), including the number of wells proposed for MNA sampling, the proposed analytical suite, and the proposed frequency of monitoring. In addition, revise Section 6.5.2 to explain the basis for the assumption that five years of MNA monitoring is appropriate.

78. Section 6.5.3, Alternative Tc2 – MNA and LUCs, p. 6-23: This section does not specify how long MNA monitoring will be conducted as part of Alternative Tc2 (MNA and LUCs). Revise Section 6.5.3 to specify for how long it is assumed that MNA monitoring will be conducted under Alternative Tc2, and provide data to support the assumption.

79. Section 7.1.4, Reduction in Toxicity, Mobility, or Volume, p. 7-2: The name of the criterion is incorrect; it should include the phrase "through treatment." In addition, although treatment is discussed in this section, it should be clearly stated that treatment is required to satisfy this criterion. Revise the title of Section 7.1.4, and ensure that the text clearly states that treatment is required to satisfy this criterion.

80. Table 7.1, Detailed evaluation of remedial alternatives – Source TMZs: Several issues were identified in review of this table:

a. It is unclear why Alternative S1 (ISTT and LUCs) was assigned a score of 10 for "Degree or quantity of contaminant destroyed or treated," given the stated uncertainty related to the effectiveness of this treatment option in the bedrock zone.
b. The assessment of "Adequacy and reliability of controls" should assess the ability of LUCs to prevent unacceptable exposures; this is not included in Table 7.1.
c. Each alternative was scored relatively highly under "Time until IRAOs are achieved;" however, based on the supporting text in the table, it appears there is much uncertainty associated with meeting the IRAOs. Therefore, it is unclear if the scores are supported. In addition, it appears this criterion evaluation is biased by the assumption of five years for each; however, short-term effectiveness should include an estimate of the time to reach remedial goals, which does not appear to have been done.
d. Criterion 4(d) (Type and quantity of treatment residuals) states that no treatment residuals are associated with EISB; however, EISB does leave treatment residuals (i.e., the dead bacteria will

increase total organic carbon and total suspended solids concentrations, the water will not be drinkable and will be odoriferous). Based on this, a score of 10 for Alternative S2 (EISB and LUCs) does not appear appropriate.

Revise Table 7.1 to address these issues.

81. Table 7.2, Detailed evaluation of remedial alternatives – K-1004 Plume TMZ: Several issues were identified in review of this table:

a. The assessment of "Adequacy and reliability of controls" should assess the ability of LUCs to prevent unacceptable exposures; this is not included in Table 7.2.
b. Alternative P2 (MNA and LUCs) does not fully meet the criterion "Reduction of toxicity, mobility, or volume through treatment." MNA may be considered as treatment, but it is not deliberate treatment, and it is not clear that full dechlorination is occurring at K-1004. This needs to be demonstrated in the FFS, and the scoring for Alternative P2 should be revised accordingly criterion. In addition, there is no estimate of the mass that would be reduced by Alternative P2.
c. Each alternative was scored relatively highly under "Time until IRAOs are achieved;" however, based on the supporting text in the table, it appears there is much uncertainty associated with meeting the IRAOs. Therefore, it is unclear if the scores are supported.
d. It is unclear why both alternatives are scored the same for "Time until IRAOs are achieved" when Alterative P1 (EISB and LUCs) employs active treatment, which should reduce the time to meet IRAOs relative to Alternative P2.
e. The text of the table states that for both Alternatives P1 and P2, "The IRAOs may not be met in the 5 years of the IRA" but also states, "Both alternatives P1 and P2 are expected to achieve their IRAOs in 5 years." The reason for this discrepancy is unclear.

Revise Table 7.2 to address these issues.

82. Table 7.2, Detailed evaluation of remedial alternatives – K-1004 Plume TMZ: Regarding Table 7.2, EPA suggests scoring Alternative P0 and Alternative P2 using the following factor/consideration, if possible, there should be greater differentiation between the score for the two alternatives when it comes to elements that involve monitoring or tracking data, such as "Magnitude of residual risks." If there is no basis for assessing how a remedy performs (no action), then the performance elements for such an option need to be given a very low score. For elements that are associated with aspects of natural attenuation monitoring such as "Protection of workers during RA," the current scores are acceptable. Otherwise, there should be no differentiation in P0 and P2 scores, such as "Treatment process used" because this element is not a factor that can be monitored or tracked and is unrelated to aspects of natural attenuation monitoring. This comment also has applicability to tabular evaluations of remedial options for other parts of the ETTP Main Plant Area.

If there is information suggesting natural attenuation is more effective in one area compared to another area (specifically, there seems to be a stronger case for natural attenuation effectiveness at the Tc-99 area based on the few wells there with a lengthy monitoring history (refer to Table 2.12) versus wells with a lengthy monitoring history at the K-1004 area (consider Table 2.14 and comments above on apparent trends or absence of trends in groundwater monitoring data from K-1004 wells) then the MNA Alternative scoring for the area with a better indication of natural attenuation effectiveness should, if anything be higher relative to the no action alternative than for the area where natural attenuation effectiveness is more questionable. This is not the case for at least some of the Alternative Description

Criterion scores in Table 7.3 versus Table 7.2. For example, Alternative Tc2 has a score of 7 for magnitude of residual risks versus a score of 8 for magnitude of residual risks for Alternative P2 (score of 8), despite the fact Tc-99 area groundwater monitoring suggests a greater degree of apparent natural attenuation effectiveness for wells with long-term monitoring compared to the apparent degree of natural attenuation effectiveness (or ineffectiveness) for two of the three K-1004 wells with long-term monitoring data.

83. Table 7.3, Detailed evaluation of remedial alternatives for Tc 99 TMZ: Several issues were identified in review of this table:

a. The assessment of "Adequacy and reliability of controls" should assess the ability of LUCs to prevent unacceptable exposures; this is not included in Table 7.3.
b. Alternative Tc2 (MNA and LUCs) does not meet the criterion "Reduction of toxicity, mobility, or volume through treatment." This criterion should be assessed as it relates to employment of a treatment technology. The scoring for Alternative Tc2 should be revised to reflect that it does not meet this criterion.
c. Each alternative was scored relatively high under "Time until IRAOs are achieved;" however, based on the supporting text in the table, it appears there is much uncertainty associated with meeting the IRAOs. Therefore, it is unclear if the scores are supported.
d. It is unclear why both alternatives are scored the same for "Time until IRAOs are achieved" when Alterative Tc1 (SBGT, MNA and LUCs) employs active treatment, which should reduce the time to meet IRAOs relative to Alternative Tc2.
e. The text of the table states that for both Alternatives Tc1 and Tc2, "The IRAOs may not be met in the 5 years of the IRA" but also states, "Both alternatives Tc1 and Tc2 are expected to achieve their IRAOs in 5 years." The reason for this discrepancy is unclear.

Revise Table 7.3 to address these issues.

84. Table 7.3, Detailed evaluation of remedial alternatives for Tc 99 TMZ: It is not clear from Table 7.3 why the criterion scores for factor 6(d) and factor 6(e) would be lower for Alternative Tc2 versus Alternative Tc1. Please clarify.

85. Table 7.4. Source alternatives balancing criteria score summary, p. 7-28: Referring to Table 7.4 (and elsewhere, as appropriate), it seems inappropriate to give a source area no action remedial option a score of 10 for "ability to monitor effectiveness of remedy" when there is no monitoring associated with the remedial alternative. Please clarify or offer a different value and explain as appropriate.

86. Appendix B, Section B.2, TMZ Determination Criteria, p. B-11: The text states that the contaminant plume maps are based on data for monitoring wells from 2019, but it is unclear if all of the 2019 data are provided in the FFS. In addition, it is unclear why only data from 2019 was used in Appendix B, since the site-specific figures in Section 2, Nature and Extent of Contamination, use additional data (e.g., see Figure 2.19, Distribution of VOCs in the K-1004 Area, with TCE at BRW-111 from a sample collected in 2017 as listed in Table 2.14, Concentrations of selected analytes exceeding MCLs in the K-1004 Area). Revise Appendix B to clarify the reason for using data from 2019 and ensure all data used to generate the plume maps are provided in the FFS.

87. Appendix C, Cost Estimate: Potential discrepancies were identified in the scope of the remedial alternatives described the main text of the FFS and Appendix C. For example:

a. Section C.4.2 (General Assumptions for All Remedial Alternatives) states, "The TMZs for the source zones include both the unconsolidated and bedrock zone groundwater plumes, and the aerial footprint is considered to be equal within both aquifer units." However, Section 6.3 (Detailed Description of Alternatives for Source TMZs) states, "K-1239 Area is the only source area where unconsolidated treatment would not be performed, as there is very little unconsolidated soil at this site location due to historical site grading activities. K-27/K-1232 currently does not show source contamination in the unconsolidated zone; however, Zone 2 work has indicated there is a potential for there to be a source in this zone." Based on this information, it is unclear if the costs for K-1239 and K-27/K-1232 should be adjusted to address the bedrock zone only.

b. Section C.4.2 (General Assumptions for All Remedial Alternatives) states, "Well installation includes five new bedrock wells and five overburden/weathered bedrock wells at each representative site;" however, it is unclear if monitoring at K-1004 should include bedrock wells only, and if monitoring at the Tc-99 plume should include unconsolidated zone wells only, based on the descriptions of the alternatives in Section 6.0 (Development and Analysis of Alternatives).

c. Spreadsheet 4 (Cost Estimate S2-Enhanced In Situ Biological Treatment) indicates that 180 injection wells will be installed; however, Table 6.5 (Significant EISB design components for Alternative S2) appears to indicate that 60 clustered wells will be installed, and it is unclear how many wells are in each cluster.

d. Spreadsheet 5 (Cost Estimate S3-In Situ Soil Mixing and EISB in Bedrock) assumes 13,167 cubic yards of soil for mixing and 711 tons of ZVI; however, Table 6.6 (Significant ISSM and EISB design components for Alternative S3) assumes 13,333 cubic yards of soil, 720 tons of ZVI, and 180 tons of bentonite.

e. Section 6.4.2 (Alternative P1 – EISB and LUCs) states that "it was assumed that a second round of injections would occur at year 2 and be followed with a 3-year period of post-injection monitoring;" however, Section C.4.4 (Assumptions Specific to Remedial Alternatives – Plume Areas) does not include such an assumption. This assumption should be clarified or confirmed in Section C.4.4.

The above list of examples may not be exhaustive. Revise the FFS to ensure the scope of the remedial alternatives presented in the main text and Appendix C are consistent.

88. Appendix C, Cost Estimate, Section C.2.4, Net Present Value Considerations, P. C-8: This section does not use the correct discount rate. Per the A Guide to Developing and Documenting Cost Estimates During the Feasibility Study (EPA/540/R-00/002), "For Federal facility sites being cleaned up using Superfund authority, it is generally appropriate to apply the real discount rates found in Appendix C of OMB Circular A-94." These discount rates are updated each year. The December 2020 revision (for fiscal year 2021) can be found here: https://www.whitehouse.gov/wp-content/uploads/2020/12/M-21-09.pdf. Correct the discount rate using the referenced document and ensure that the revised costs are reflected in the main text and tables.

89. Appendix C, Cost Estimate, Spreadsheet 4, Cost Estimate S2-Enhanced In Situ Biological Treatment, Spreadsheet 5, Cost Estimate S3-In Situ Soil Mixing and EISB in Bedrock, and Spreadsheet 8, Cost Estimate P1-Enhanced In Situ Biological Treatment: It is unclear why 0 gallons of substrate and 0 days of operator are listed under "EVO Injection Costs." Revise Spreadsheets 4, 5, and 8 to include quantities for these line items, or clarify why they are listed as "0."

90. Appendix C, C.4.2 GENERAL ASSUMPTIONS FOR ALL REMEDIAL ALTERNATIVES, p. C-11: The text states that the intent is to install five new performance monitoring bedrock wells and five new performance monitoring overburden/weathered bedrock wells at each representative site. The following Appendix C discussion indicates that performance monitoring will be done by monitoring 10 wells at each site and may include existing wells or newly installed wells. Two questions arise from these two statements:

1. Does it make sense to install an equal number of bedrock and overburden/weathered bedrock wells at each area of remediation considering that at some areas there is less or inconsequential contamination in one or the other of the two proposed monitoring zones?

2. It appears incongruent to indicate in the first statement than 10 new performance monitoring wells will be installed in each area and in the second statement to state that performance monitoring will be at 10 wells that may include some existing monitoring wells, implying that some of the newly installed performance monitoring wells might not be used for performance monitoring.

Some wording modifications appear to be needed in these Appendix C statements so there is proposed performance monitoring that is consistent with identified depths of significant contamination at each TMZ and new wells are installed based on perceived deficiencies in the currently available monitoring well network, rather than adding a fixed number of new wells at each TMZ regardless of the perceived need for new wells at each area.

91. Appendix D: Introduction, p. D-11. The text states:

> Monitored natural attenuation (MNA) has been selected as a component of some of the alternatives for the K-1004 and technetium-99 (Tc-99) plumes for the Focused Feasibility Study at East Tennessee Technology Park (ETTP). MNA takes advantage of a range of processes which, unaided by deliberate human intervention, reduce the concentration, toxicity, or mobility of contaminants. These processes are monitored over time to verify progress toward the remedial goals.

This is a pre-decisional statement. The purpose of the FFS is to determine if MNA may be a viable alternative in remedial selection. This needs to be clarified throughout this appendix (and the FFS document). The last sentence must be rewritten to convey that the "goal" (not goals) is to achieve the contaminant MCL or pursue ARAR waivers. This FFS is determine if MNA will work to reduce contamination levels to MCLs over a reasonable period of time (i.e., <100 years).

92. Appendix D, Section D.2, CVOC Concentration Trends and Daughter Product Data Evaluation, p. D-13: The list of parameters to be collected to demonstrate natural attenuation should include methane, ethane, ethene, and chloride. Revise the list of parameters to include these analyses.

93. Appendix D, Section D.2. CVOC CONCENTRATION TRENDS AND DAUGHTER PRODUCT DATA EVALUATION, p. D-13. Specific monitor wells are listed but no figure is provided. A figure showing the groundwater plume associated with K-1004 plume must be included to reference the reader to the site. Also include on the figure the specific monitoring wells that will be used as part of this investigation. In general terms explain if additional wells will be added and show on the figure the most likely locations for them. The reader needs to understand if there are sufficient monitoring wells (and properly located) to test this remedial alternative and to draw conclusions at the end of the investigation.

94. Appendix D, Figure D.3. Eh – pH region in which ETTP groundwater, spring water, and surface waters lie in relation to the technetium Eh – pH speciation regions at 25°C and 900 pCi/L Tc-99, p. D-19: The monitoring wells discussed in Section D.3.2, Concentration Data Evaluation (i.e., UNW-026, UNP-008, BRW-015, UNW-137, and UNW-144), are not labeled on this chart. Instead, three other monitoring wells are noted (i.e., UNW-087, BRW-025, and UNW-003). Revise this chart to designate the five wells evaluated and discussed in the text.

95. Appendix D, Figure D.4, Time history of Tc-99 in four wells along the east side of the K-25 East Wing, p. D-20: The text discusses Tc-99 trends in unconsolidated well UNW-144, but the Tc-99 data for this well are not plotted on Figure D.4. Revise this figure to include well UNW-144.

96. Appendix D, D.3.2 CONCENTRATION DATA EVALUATION, p. D-18. As with the K-1004 groundwater plume, there is no groundwater plume map (figure) provided. A figure showing the groundwater plume associated with Tc-99 plume must be included to reference the reader to the site. Also include on the figure the specific monitoring wells that will be used as part of this investigation. In general terms explain if additional wells will be added and show on the figure the most likely locations for them. The reader needs to understand if there are sufficient monitoring wells (and properly located) to test this remedial alternative and draw conclusions at the end of the investigation.

97. Appendix D. Before concluding this appendix with references, the DOE must include a section on addressing the EPA policy and guidance on meeting the objectives of MNA. This demonstration does not occur in a vacuum and the analysis of MNA as a remedy will require that the objectives and specifications of EPA MNA policy and guidance are met. Specifically, the DOE will need to review the following documents and create a new section in this appendix. That new section should explain how the EPA documents listed below will be used to design a MNA investigation to determine if this remedy can be successfully demonstrated. Additionally, these documents should be added to the references as cited.

VOC Sources/Plumes

1. EPA. 1988. Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites. OSWER 9283.1-2.

2. EPA. 1999. Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites. OSWER 9200.4-17P.

3.EPA. 2004. Performance Monitoring of MNA Remedies for VOCs in Ground Water. EPA 600/R-04/027.

4. EPA. 2011. Groundwater Road Map – Recommended Process for Restoring Contaminated Groundwater at Superfund Sites. OSWER 9283.1-34.

5. EPA. 2011. An Approach for Evaluating the Progress of Natural Attenuation in Groundwater. EPA 600/R-11/204.

6. EPA. 2013. Guidance for Evaluating Completion of Groundwater Restoration Remedial Actions. OSWER 9355.0-129.

7. EPA. 2014. Groundwater Remedy Completion Strategy. OSWER 9200.2-144.

8. EPA. 2014. The Guidance for Evaluating Completion of Groundwater Restoration Remedial Actions. Office of Solid Waste and Emergency Response. OSWER 9355.0-129.

9. EPA. 2014. Groundwater Statistics Tool. https://www.epa.gov/sites/production/files/2015-11/gw_stats_tool_08112014.final_.xlsm

Inorganic-Radiological Sources/Plumes

1. EPA. 2007a. Monitored Natural Attenuation of Inorganic Contaminants in Ground Water, Volume 1 Technical Basis for Assessment. EPA/600/R-07/139.

2. EPA. 2010. Monitored Natural Attenuation of Inorganic Contaminants in Ground Water, Volume 3 Assessment for Radionuclides Including Tritium, Radon, Strontium, Technetium, Uranium, Iodine, Radium, Thorium, Cesium, and Plutonium-Americium. EPA/600/R-10/093.

3. EPA. 2015. Use of Monitored Natural Attenuation for inorganic contaminants in groundwater at Superfund Sites. OSWER 9283.1-36.

There are two separate areas proposed in this FFS for a MNA demonstration, the K-1004 VOC source/plume and the Tc-99 Radiological source/plume. Each site will have its own individual approach to testing the viability of MNA as a remedial alternative. Consistent with the EPA guidance listed above, DOE will need to explain how each contaminant source/plume can be addressed to statistically demonstrate that MNA is successful within the area tested. While specific details related to the effectiveness of MNA is more appropriate for the Remedial Design/Remedial Action Workplan, the DOE must provide an outline of the intended actions it believes are necessary to demonstrate MNA for these two locations. Merely to state that MNA is viable and present a few monitoring well concentration curves is not sufficient to explain the objectives of this remedial action and what will likely be necessary to demonstrate success.

Currently, EPA considers MNA decisions acceptable if they can statistically demonstrate attaining Safe Drinking Water Act Maximum Contamination Levels (MCLs) or risk-derived numbers (where MCLs do not occur) within 100 years. If contamination cannot reach MCLs within this period of time, the expectation is that a remedial action will be necessary. There are specific conditions that must be met, as presented in the EPA documents listed above, to select MNA as an appropriate remedy. Update this appendix to explain how this remedy will follow EPA guidance and policy in an attempt to determine if MNA can be applied to the two sites where it is proposed and potentially at other groundwater sources/plumes across the ETTP complex.

(End of Comments)